CLAIMS

1. A fuel cell stack assembly for providing power to a working load, comprising:

a first set of fuel cells;

a first threshold detector responsive to an stack terminal voltage across the first set of fuel cells;

a first transistor coupled for activation via the first threshold detector; and

a first dump load, wherein the first transistor is responsive to the stack terminal voltage across the first set of fuel cells to selectively couple the first dump load in parallel with the first set of fuel cells when the stack terminal voltage across the first set of fuel cells exceeds a threshold voltage and to uncouple the first dump load when the stack terminal voltage across the first set of fuel cells is below the threshold voltage.

2. The fuel cell stack assembly of claim 1, further comprising:

a second set of fuel cells;

a second threshold detector responsive to an stack terminal voltage across the second set of fuel cells;

a second transistor coupled for activation via the second threshold detector; and

a second dump load, wherein the second transistor is responsive to the stack terminal voltage across the second set of fuel cells to selectively couple the second dump load in parallel with the second set of fuel cells when the stack terminal voltage across the second set of fuel cells exceeds a threshold voltage and to uncouple the second dump load when the stack terminal voltage across the second set of fuel cells is below the threshold voltage.

3. The fuel cell stack assembly of claim 1 wherein the dump load is positioned upstream downstream from the fuel cells in an air flow for providing heat to the fuel cells.

4. The fuel cell stack assembly of claim 1 wherein the dump load is positioned proximate the fuel cells for providing heat thereto.

5. The fuel cell stack assembly of claim 1, further comprising:

a capacitance electrically coupled across the dump load.

6. The fuel cell stack assembly of claim 1, further comprising:

an inductance electrically coupled in series between the first set of fuel cells and the dump load.

7. The fuel cell stack assembly of claim 1 wherein the first transistor is an n-channel field effect transistor.

8. The fuel cell stack assembly of claim 1 wherein the first transistor is a p-channel field effect transistor.

9. The fuel cell stack assembly of claim 1 wherein the first transistor is one of an n-channel bipolar junction transistor and a p-channel bipolar junction transistor.

10. A shunt regulator for a fuel cell stack having a high voltage bus for providing power to a work load, comprising:

a transistor responsive to a fuel cell stack terminal voltage on the high voltage bus; and

a dump load selectively coupleable to the high voltage bus in parallel with the fuel cell stack by the transistor while the fuel cell stack terminal voltage exceeds a threshold voltage.

11. The shunt regulator of claim 10, further comprising:

a capacitance electrically coupled across the dump load.

12. The shunt regulator of claim 10 wherein the dump load comprises a resistor.

13. The shunt regulator of claim 10 wherein the transistor is one of an n-channel field effect transistor and a p-channel field effect transistor.

14. The shunt regulator of claim 10 wherein the transistor is one of an n-channel bipolar junction transistor and a p-channel bipolar junction transistor.

15. A shunt regulator for a fuel cell assembly including a fuel cell stack, the shunt regulator comprising:

load dumping means for dissipating excess power from the fuel cell stack as heat; and

transistorized threshold detection and switching means for determining when an stack terminal voltage across the fuel cell stack exceeds a threshold level and for selectively electrically coupling the load dumping means in parallel across the fuel cell stack in response to the transistorized threshold detection means detecting the stack terminal voltage exceeding the threshold level;

16. A method of operating a fuel cell stack, comprising:

determining a voltage across at least a portion of a fuel cell stack;

determining whether the determined voltage exceeds a threshold voltage; and

selectively operating a transistorized switch to place a dump load across the fuel cell stack when the determined voltage across at least the portion of the fuel cell stack exceeds the threshold voltage.

17. The method of claim 16, further comprising:

providing heat dissipated by the dump load to the fuel cell stack.

18. The method of claim 16, further comprising:

determining whether a digital logic control signal is set; and

selectively operating the transistorized switch to place the dump load across the fuel cell stack when the digital logic control signal is set while the determined voltage does not exceed the threshold voltage.

19. A method of operating a fuel cell stack, comprising:

determining a voltage across a power bus of a fuel cell stack;

determining whether the determined voltage exceeds a threshold voltage; and

selectively operating a transistorized switch to place a dump load across the power bus of the fuel cell stack while the determined voltage exceeds the threshold voltage.

20. The method of claim 19, further comprising:

providing heat dissipated by the dump load to the fuel cell stack.